Ron Rutherford
Component Leader, Compliance & Inspection
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"If the Russians are not successful in getting more flexibility in the law with regard to how enforceable evidence is collected . . . then this tool will have limited, though still valuable, use . . ."

COMPLIANCE & INSPECTION

BACKGROUND

The primary goal of the compliance and inspection component was to strengthen compliance determination methods for Russian inspectors. Technical and legal support was given to help Russian agencies to evaluate, pilot, and establish visible emission evaluations and incorporate them within Russian enterprises' ecological passports (the equivalent of American operating permits). Additional goals included strengthening Volgograd's air program enforcement by providing support for improvements in the existing emission fee system and strengthening Volgograd's inspections program with the goal of extending improvements to the Russian Federation. These efforts were aided by the work of the Legal Task Force which found authorities in Russian law for using opacity as a compliance indicator. During December 1995, RAMP representatives met with SRI-AAP and Gostandard (the office certifying official methodologies) in St. Petersburg to agree on a contract and a schedule for Method 9 (visible emissions evaluation) certification. Russian acceptance of Method 9 (opacity or visible emissions regulation) for a one year trial period was obtained in May 1996. This approval was later extended for an indefinite time.

ACCOMPLISHMENTS

The introduction of the concept of visible emissions observations and opacity as an enforceable standard was accomplished to give Russian inspectors, as well as enterprise operators, an easy and inexpensive means to evaluate if and how well processes and emissions control devices are being operated and maintained to minimize emissions of particulates. This has been a very successful tool in the US and has been recognized by the Russians as a valuable new compliance tool. This has been a joint effort of the Compliance and Inspection, Emissions Testing and Legal Task Force components of RAMP and has resulted in the establishment of a visible emissions observer training program complete with a train-the-trainer course and smoke generators, a certification by the Russian Federation of a Russian version of US EPA Method 9, an experimental project in Volgograd to demonstrate the efficacy of visible emissions observations and their use setting opacity standards for enterprises, and the support in Russian law to use opacity as a compliance method.

OBSERVATIONS

The Inspection and Permits Program of VESA was first evaluated in September 1994, when the high level of inspector expertise and the sophistication and completeness of the ecological passport (permits) program was noted. Russian Federation ecological

(environmental) laws were found to be substantial and multimedia in nature. Regarding air regulation, all sources of air emissions are regulated at the enterprise level and addressed in the passport, including mobile source emissions. Inspectors are well-trained engineers knowledgeable in the processes of the enterprises to which they are assigned, often being former employees of these enterprises.

"The introduction and demonstration of opacity as a new standard in ecological passports have moved the efficacy of an inspection program to new heights."

Oleg Kreitchi
Head Inspector, VESA
Volgograd, Russia

However, offsetting the thoroughness of the passports and the technical expertise of the inspectors are the often unrealistic limits placed on emissions and the "non arms-length" relationship of the inspectors with the enterprises' management. This gave rise to the paradox of apparently strong ecological laws, emission limits and qualified inspectors, but still having obvious air pollution. At most enterprises it was observed that the implementation of consistent operation and maintenance procedures on existing controls or with work practices and housekeeping activities could significantly reduce current emissions.

Regarding enforcement program evaluation, it was apparent that the system of fining enterprises established in Russian ecological law was clearly ineffective due in part to devaluation of the ruble. Current Russian law establishes a "fee to pollute" scheme whereby enterprises pay a rate for each ton of pollutant emitted, which is increased when allowed levels are exceeded and increased based on exceeding specific time periods. The cost of pollution controls compounded with the devaluation of the ruble made most fees negligible; it is currently much less expensive for enterprise management to pay these fees than expend the resources to comply.

A serious problem observed is that third-party verification is required of any violations that an inspector may find and attempt to enforce. Though this has its roots in Russia's past, it should be addressed if there is to be an effective future Russian enforcement program. There are some strong cultural issues that must be confronted and resolved if enforcement of Russian environmental laws is to be effective. The US/ Russia Environmental Legal Task Force has been addressing this problem and seeking ways to remedy such restrictions on enforcement.

Russian presented "smoke school".

IMPACTS

If the interest continues that the Russians have shown to date in the concept of opacity as an enforceable standard, separate and distinct from the other pollutants, and of the use of visible emissions observations as an effective low cost inspection tool, then these activities will have a lasting influence. On the other hand, if the Russians are not successful in getting more flexibility in the law with regard to collecting enforceable evidence (i.e., the third party verification issue) then this tool will have limited, though still valuable, use. Currently, Russian law allows the use of opacity as an indirect indicator of a violation of underlying

mass emissions standards, by indicating poor operation of control equipment, proper operation of which is required in Russian law. So, even if opacity per se is never legislated to be enforceable by itself, inspectors, and even enterprise operators, can use it to indicate problems with process or control equipment operations and take any necessary corrective measures to minimize emissions and order stack tests.

As for the issues raised with the relationship of inspectors to enterprise management and with the current "pay to pollute" fee system of "fines", only time will tell. However, the concept of fees for pollution versus fines has cultural elements that will not easily change. It will take some time for the differences in these two approaches to enforcement to be implemented by the Russians.

The RAMP experiences demonstrated clearly the value and need for a consistent, strong, timely and fair enforcement program if environmental laws are to be effective and not just words. While Russian environmental laws are impressive, covering a broad range of pollutants and imposing very restrictive health-based emissions limits, they have not been effective in improving the quality of the environment.

Principals in Compliance and Inspection

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"There are few places where saturation sampling is both more needed and better-suited than Russia."

BACKGROUND

Fully understanding the character of air quality problems over time and space is absolutely fundamental to conducting an effective and efficient air quality management program. This understanding is best achieved through the careful integration of monitoring, modeling, and source engineering disciplines and activities. Toward this end, one of RAMP's original priorities was to familiarize the Russian partners with special US air monitoring techniques involving saturation sampling and source apportionment.

Involving no truly continuous or automated methods, Russian air monitoring systems are exceedingly labor-intensive and often do not offer compelling detection sensitivities. Given the lack of resources to procure newer technologies, the literally hundreds of ambient standards for which the Russians are responsible, and the enormous scope and complexity of the problems they face, the Russians have done a remarkable job of developing and maintaining permanent air monitoring networks throughout the Federation. Unfortunately, the basic representativeness and utility of these networks are largely unknown.

Saturation sampling and source apportionment techniques developed in the US can effectively address these uncertainties, leading to improved network design and more informed emissions control strategies. Saturation sampling provides a rigorous profile of air quality impacts throughout an area of interest through the deployment of a large number of portable, low cost samplers for a relatively short period. Source apportionment is a technique which identifies the relative contribution made by individual sources or source types to total pollutant impacts using chemical fingerprints unique to those sources or source types. And because they mark something of a middle ground between low-tech and high-tech approaches, these techniques are well-suited for application to the Russian circumstance. An intensive air characterization study in Volgograd was conceived by RAMP to introduce these and related techniques to the Russian contingent in 1994 for possible subsequent application throughout the Federation.

ACTIVITIES

This work was heavily dependent on the timely procurement and delivery of monitoring and analytical equipment under US AID's Commodity Import Program (CIP). Successive delays encountered in the CIP procurement process necessitated three re-schedulings of the Intensive Study, from 1994 to 1997. A total of three mini-saturation studies were conducted in the intervening years with US EPA equipment to develop on-site familiarity and proficiency with some techniques to inform the design of the larger study and to develop some empirical data against which the efficacy of dispersion modeling analyses

could be reconciled. A number of other collateral projects (e.g., Russian-US inter-method comparisons) were conceived but unrealized.

A scaled-down version of the intensive study began in the summer of 1997. Comprised of contemporary ambient sampling, source testing, and source production tracking functions, the original scope of the study was reduced by an estimated 70% due to prevailing time and resource constraints.

"Our experience has demonstrated the utility of saturation sampling - now to the business of finding a permanent 'home' for it in Russia."

Liudmila Kurdina
RosHydromet
Volgograd, Russia

ACCOMPLISHMENTS

The first mini-saturation study in Volgograd was conducted in Fall 1994, yielding a Russian contingent trained in the design and operation of a 10-site network of samplers (sited throughout the Triangle), identification and resolution of several operational and logistical problems associated with these types of studies, and some useful PM-10 data from which to design subsequent studies. A brief report on this study was prepared in 1995, including the evaluation of some 200 ambient PM-10 samples.

The second and third mini-saturation studies built on the experience of the first study and were designed to profile bi-seasonal PM-10 impacts in Volgograd. Conducted in Fall 1995 and Winter 1996, these new studies improved operational proficiencies and yielded mass PM-10 concentrations and some chemical information for use in revising the emphasis on emissions inventory development (e.g., considering area sources) and model reconciliations. Approximately 400 PM-10 data points were generated in these studies, together with contemporary meteorological and source production information. A draft report of the Fall 1995 study and a preliminary work-up of the Winter 1996 study results were prepared.

Installation of air quality monitor near Red October Steel Mill.

The 1997 intensive study emphasized profiling PM-10 impacts in the North sector of Volgograd, with more limited characterizations of impacts in the South sector. Some 500 PM-10 data points were generated by this study, with a subset of 200 samples submitted for elemental analyses. These data, together with source production and source test information, will provide the basis for preliminary source apportionment and other contextual analyses.

IMPACTS

The impacts of this work have been both direct and subtle in character. The Russians are now familiar with and proficient in the conceptual and applied aspects of the work undertaken through this component. In addition to generating volumes of new information on Volgograd-

specific air quality impacts, the Russians clearly see and appreciate the practical virtues of exploiting these low cost/data-rich techniques in their current circumstance. And importantly, they are also devoting serious thought to developing a Russian PM-10 ambient standard and may reconsider their conceptual approach to non-attainment areas.

These efforts have also produced a far more subtle, but no less profound effect. Armed with new and accessible techniques, the Russians are now more prepared to confront thorny technical issues from a positive, can-do perspective. If one of RAMP's primary objectives was in assisting the Russians in their search for solutions to what previously were seemingly insoluble problems, then some real measure of success has been achieved.

Resource questions and the fact that several organizations in the Russian Federation, both at the federal and local levels, deal with monitoring issues makes it difficult to predict the future success of this component with any assuring confidence. Issues related to the availability of the CIP-procured equipment to replicate special monitoring initiatives elsewhere throughout the Russian Federation are far from settled. But, the RAMP experience has proven that the innovative air characterization techniques tried under RAMP both work and have wide utility in Russia, so despite these reservations, RAMP participants continue to be optimistic about the future use of these techniques in Russia.

DOCUMENTATION

"Report on the Fall 1994 Volgograd Saturation Study"

"Draft Report on the Fall 1995 Volgograd Saturation Study"

"Preliminary Draft Report on the Winter 1996 Volgograd Saturation Study"

"1997 Volgograd Saturation Monitoring Program: Quality Assurance/Operation and Maintenance Plan"

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